Schnabel Engineering North, LLC

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July 31, 2003

Mr. John McGaw
Government of the District of Columbia
Suite 317
1350 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

Subject: **Concrete Coring Results for the Roof of the Existing Howard Theatre, Located at 7th and T Streets, Northwest, Washington, D.C. (Our Reference No. 03121108)**

Dear Mr. McGaw:

We are pleased to submit this letter that presents the results of concrete coring and compressive strength testing performed at the above referenced project location. This letter and the work performed have been prepared in accordance with our proposal of June 4, 2003 and as authorized by your issuance of Purchase Notification No. 252763.

Services performed under this agreement included the coring of the concrete roof at three locations over the existing balcony area of the theater. Additionally, we have also coordinated with Mr. James Madison Cutts (JMC), Consulting Structural Engineer, who has performed a limited structural inspection of the existing building. The results of his investigation are presented as an attachment to this letter.

Concrete Coring

Personnel from our office visited the existing Howard Theatre on June 24, 2003. Our purpose was to obtain three concrete cores from the roof area over the balcony of the theater. The balcony area is located over the entrance to the theatre at the north end of the building. The concrete cores were taken from the west side. Cores were identified as Nos. 1 through 3. No. 1

was taken about eight from the north wall, No. 2 was taken 11 feet from the north wall, and No. 3 was taken about 13.5 feet from the north wall. Table 1 below presents concrete core data.

Table 1

Core No.	Length of Core (Inches)	Concrete Compressive Strength (psi)
1	4-5/8	1,860
2	1-1/2*	--
3	4-1/4	2,210

*-The balance of the core was lost due to a break at the concrete and the welded wire fabric interface.

Results of concrete compressive strength testing were forwarded to JMC. Note that while coring, drilling water was observed to be seeping through the concrete and returned out at the concrete roof face about 8 to 10-inches away from the core location.

Core holes were filled with a dry pack of sand and cement upon completion of our work. Plywood was then fastened to the ceiling to support the dry pack during curing.

We appreciate the opportunity to be of service to you on this project. Please contact us if you have any questions or comments on any aspect of our investigation.

Sincerely,

SCHNABEL ENGINEERING NORTH, LLC

John E. Rankin
Project Engineer

Bill Khouri, P.E.
District of Columbia

JER/BQK/tbk/jhd
G:\03121108\WP\FINAL\Field Investigation Letter 07-31-03.doc

cc: Mr. Jim Cutts
James Madison Cutts

Attachments:
Inspection Letter provided by JMC; dated July 18, 2003

James Madison Cutts LLC

Consulting Structural Engineers

2000 L Street Northwest Suite 840 Washington DC 20036

202/822-8222
Fax 202/822-8330
www.jmcutts.com

July 18, 2003

Mr. John McGaw
Government of the District of Columbia
Suite 317
1350 Pennsylvania Avenue, NW
Washington, DC 20004

Re: Howard Theater

Dear Mr. McGaw,

An inspection by our office was made of a portion of the steel framing of this building, including the roof steel and concrete roof slab, on June 24, 2003. Schnabel Engineering Associates, Inc. provided the access for the inspection and also took several concrete sample cores to verify concrete quality and strength. A copy of the results of their tests is included.

The conclusions and recommendations in this letter are not meant to be all-inclusive but general in nature so as to provide guidelines for future development. The only issues addressed are structural in nature.

1. In order to determine the soundness of the concrete roof slab, cores were taken through the slab and tested to failure. A small sample of the steel mesh reinforcement was removed and measured for size and spacing.

   a. The slab overall thickness is 4-1/2" reinforced with an expanded steel mesh resulting in a diagonal pattern with an equivalent steel area of 0.1055 sq. inches per foot width of slab. The concrete compressive strength is roughly 2000 lbs. per sq. in. The aggregate in the mix is predominately cinders, which were commonly used at the time of this building's construction.

   b. Using the concrete slab thickness and strength together with the amount of mesh reinforcing the calculations result in a Live Load capacity of 30 lbs. per sq. in., which meets current code requirements.

2. Accessibility restrictions prevented examination of most of the steel roof framing, however those members that support the roof slab and are over the balcony could be reached from the scaffolding erected. In general it was found that a major build-up of rust is occurring along the upper surface of the roof purlins at the intersection of the bottom flange and the beam web as shown in the enclosed sketch. Moisture collects at this location along the beam and forms a puddle, which does not drain.

   Although complete deterioration along this part of the beam has not yet occurred, the roof leaks and continual presence of moisture in the building will eventually result in failure of at least some of these steel roof purlins. Analysis indicates that if they are intact, considering

no loss of metal, the existing purlins can safely support the roof load. Deterioration has resulted in some loss of section, which means that steel plates or angles will probably need to be added. During any renovation, all of the roof steel will have to be cleaned and examined.

This theater was built over ninety years ago and has been exposed to all of the local weather conditions during this time, wind, rain, and snow, and has remained structurally sound. There is no reason why this building cannot continue to do so provided water is kept out and provided any deteriorated steel is repaired. Therefore, any plans for further use of the Howard should include provisions for a complete inspection and repair of all roof members where rusting has caused a loss of metal.

Before the existing conditions become worse, we recommend a new watertight roof plus the installation of some venting of the interior space.

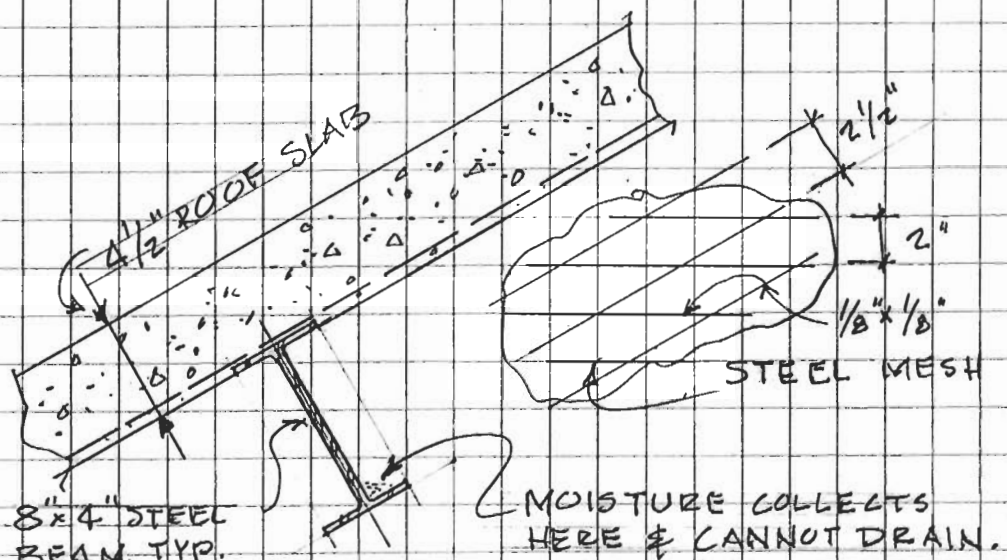
If you would like to discuss the above in more detail, please call.

Sincerely,

James Madison Cutts
President
JMC/mlc

cc: Mr. Jim Schnabel

James Madison Cutts	Consulting Structural Engineers Washington DC	JOB Howard Theatre LOCATION D.C. BY C CHECK DATE 7/23/03 SHEET SK 1



TYPICAL ROOF CONSTRUCTION

SCALE: 1 1/2" = 1'-0"

Schnabel Engineering

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Project Name: Howard Theatre
Project Number: 03121108
Date: June 30, 2003

COMPRESSIVE STRENGTH OF CONCRETE CORES

ASTM C-42

Sample No.	Length Uncapped (in.)	Length Capped (in.)	Core Diam. (in.)	Area (eq. in.)	Load (lbs.)	Compressive Strength (psi)	Length Diameter Ratio	Correction Factor	Corrected Compressive Strength (psi)
1	3.03	3.34	1.70	2.27	4,230	1,865	1.96	1	1,860
3	3.15	3.35	1.70	2.27	5,010	2,208	1.97	1	2,210

Notes
Roof over balcony area

CONCRETE CORE CORRECTION FACTOR

L/D RATIO	FACTOR	L/D RATIO	FACTOR
<1.00	Do Not Test	1.30 to 1.38	0.94
1.00 to 1.02	0.87	1.39 to 1.46	0.95
1.03 to 1.06	0.88	1.47 to 1.56	0.96
1.07 to 1.10	0.89	1.57 to 1.69	0.97
1.11 to 1.14	0.9	1.70 to 1.81	0.98
1.15 to 1.18	0.91	1.82 to 1.94	0.99
1.19 to 1.22	0.92	1.94 to 2.10	1.00
1.23 to 1.29	0.93		

Diameter of Cores - See above
Condition of Cores - Same day break
Direction of Loading - perpendicular.
Nom. Max. Agg. Sz. - 1 inch
Age of Concrete -
Date Received - June 27, 2003
Date Tested - June 30, 2003
Tested By - J CAUDILL
Prepared By - J CAUDILL